INDEX

Page

Abnormalities, in flower and fruit of *Capsicum frutescens*. H. L. Cochran ... 737–748
Absorption of moisture from plant containers. Linus H. Jones ... 511–516
Acidity, mushroom compost heaps, effect of distribution of oxygen and carbon dioxide therein. Edmund B. Lambert and A. C. Davis ... 587–601
ACKERMAN, F. G., and DULEY, F. L.: Run-Off and Erosion from Plots of Different Lengths ... 505–510
Aerobacter aerogenes, thermal resistance, effect of hypertonic sugar solutions on ... 461–462
Agaricus campestris. *See* Mushroom.
Alaska pea. *See* Pea, Alaska.
Albumin, egg, coagulation, effect of hypertonic sugar solutions on ... 463–464
Alfalfa—
  cold resistance, relation to protected diastatic activity ... 235–237
  diastase digestion, starch-sugar equilibrium, relation to seasonal differences ... 233–234
  diastatic activity—
    determination ... 221–224
    relation to varietal and seasonal differences ... 224–231
  enzyme activity, relation to sugar in extract and dry matter in roots ... 231–233
  from grazed plots, manganese content. Donald W. Bolin ... 657–663
  hay. *See* Hay, alfalfa.
  manganese content, determination by new method ... 657–662
  resistance to bacterial wilt, varietal studies ... 1085–1098
  roots, diastatic activity, relationships, study ... 219–239
  selection for resistance to bacterial wilt ... 1097
  testing for resistance to bacterial wilt. Fred Reuel Jones ... 1085–1098
  tops, diastatic activity, relationships, study ... 219–239
  varieties—
    enzymatic responses, determination of hardiness by. H. M. Tysdal ... 219–240
    hardiness, determination by enzymatic responses. H. M. Tysdal ... 219–240
    inoculation with bacterial wilt organism ... 1085–1088
ALLARD, H. A., and EVANS, MORGAN W.: Relation of Length of Day to Growth of Timothy ... 571–586
Antiseptics, efficacy in control of malformations on apple trees ... 924–926
Apanteles—
  lacteicolor, parasitism by hyperparasites, study ... 360–362, 375
  melanoscelus, parasitization by hyperparasites, study ... 362–363, 375
  solitarius, parasitization by hyperparasites, study ... 364–366, 375
Aphelenchoides xylophilus, n. sp.—
  a nematode associated with blue-stain and other fungi in timber. G. Steiner and Edna M. Buhrer ... 949–951
  ecological relations ... 949–951
  technical description ... 951
Apple trees—
  callus as barrier to infection by *Phytomonas rhizogenes* ... 867–868
  condition, influence on infection by hairy-root bacteria ... 870–874

Page

Apple trees—Continued.
  grown in metal cylinders, absorption of nitrogen from three horizons of fertilized Hagerstown clay loam, study ... 845–856
  hairy-root control, discussion ... 910, 911
  inoculation with—
    hairy-root organism, methods ... 861–867
    Phytomonas spp ... 889–890
  malformations at unions of piece-root-grafts, occurrence and control. A. J. Riker, G. W. Keitt, E. M. Hildebrand, and W. M. Banfield ... 913–939
  nursery—
    crown gall of, seasonal development, studies ... 887–912
    hairy-root, crown gall and wound overgrowth on, seasonal development. A. J. Riker and E. M. Hildebrand ... 887–912
    hairy-root organism, pathogenic on, life history in relation to. E. M. Hildebrand ... 857–885
    stock, malformations, studies ... 857–883, 887–912, 913–937
    wound overgrowth on, seasonal development studies ... 889–891, 902, 908–909
  piece-root-grafted, hairy root, crown gall, and other malformations at unions of, occurrence and control. A. J. Riker, G. W. Keitt, E. M. Hildebrand, and W. M. Banfield ... 913–939
  root-grafted—
    overgrowths, causes, descriptions, and distribution ... 915–919
    overgrowths, control ... 920–934
  varieties, susceptibility to infection by hairy-root organism ... 874
Apples—
  sprayed and unsprayed, entrance by Colorado and Virginia strains of codling moth. Walter S. Hough ... 533–553
  spraying, relation to codling-moth control ... 533–552
Apricot trees—
  growth and fruit yield, correlations with severity of pruning. H. S. Reed ... 1–30
  growth, correlations with yields and number of fruits per pound ... 18–22
  pruning severity, correlations with subsequent growth and fruit yield. H. S. Reed ... 1–30
Apricots—
  number of fruits per pound, correlations with pruning and yield ... 14–18
  yield, correlation with weight of wood removed in pruning ... 7–13
Armillaria mellea—
  growth on expressed sap of tree roots ... 207–211
  infection of—
    fruit trees, formation of gum cavities ... 205–207
    roots, cytological study ... 199–205
    roots, histological study ... 192–199
  (Vahl) Quel., infection, parasitism, and host resistance, studies. Harold E. Thomas ... 187–218
Arsenicals, injury to snap beans grown under unfavorable soil conditions, study ... 447–451
Arthropods, root-feeding, influence on entrance of crown-gall organism into raspberry roots ... 773, 774–778
Ash content, leg bones of chickens, relation to normal development. H. M. Harshaw, J. C. Fritz, and Harry W. Titus ... 997–1008

AUSEMUS, ELMER R.— Page
Correlated Inheritance of Reaction to Diseases and of Certain Botanical Characters in Triangular Wheat Crosses.... 31–57
HAYES, H. K.; STAKMAN, E. C.; and BAMBERG, R. H.: Correlated Inheritance of Reaction to Stem Rust, Leaf Rust, Bunt, and Black Chaff in Spring-Wheat Crosses.... 59–66
Awns, development in wheat crosses, inheritance studies.... 36, 47, 54
Azotobacter—
growth requirements with magnesium, calcium, and iron in free and fixed nitrogen. C. Kenneth Horner and Dean Burk.... 981–995
nutrient requirements, study.... 981–994

Babesia—
argentina—
characteristics in United States. Charles W. Rees.... 427–438
morphological characters.... 429–433
physiological characters.... 433–436
bigemina—
characteristics in United States. Charles W. Rees.... 427–438
morphological characters.... 429–433
physiological characters.... 433–436
spp.—
biometry.... 429–431
cytology.... 432–433
Bacillus subtilis, thermal resistance, effect of hypertonic sugar solutions on.... 461–462
Bacteria—
infection of hens' eggs, effect of washing, study.... 67–87
resistance to heat, studies.... 453–467
thermal resistance, effect of hypertonic sugar solutions on. A. C. Fay.... 453–468
Bacterium—
beticola, comparison with *Bacterium gypsophilae*, n. sp.... 1109, 1110
gypsophilae, n. sp.—
comparison with *Bacterium beticola*.... 1109, 1110
cultural characters.... 1105
hosts.... 1109–1110
morphology.... 1108–1109
natural infection and control.... 1109–1111
physiologic characters.... 1105–1108
technical description.... 1109
hederae—
control measures.... 814
pathogenicity, morphology, and cultural characters.... 809–813
symptoms on English ivy.... 808–809
technical description.... 813
new, production of gall similar to crown gall on *Gypsophila*. Nellie A. Brown.... 1099–1112
tabacum—
causal organism of tobacco wildfire disease, study.... 411–425
host range, discussion.... 424–425
inoculation experiments.... 415–418, 420–421
toxin production and relation to host range. E. E. Clayton.... 411–426
toxin production in pure culture, method.... 411–412
toxin, properties and action on plant tissues.... 412–415
translucens undulosum. *See* Wheat, black chaff.
tumefaciens. See *Phytomonas tumefaciens*.
Bags, use in selfing sugar beets, experiments.... 324, 325–337
BALDELLI, MARY, and CHILD, ALICE M.: Press Fluid from Heated Beef Muscle.... 1127–1134
BAMBERG, R. H.; HAYES, H. K.; AUSEMUS, E. R.; and STAKMAN, E. C.: Correlated Inheritance of Reaction to Stem Rust, Leaf Rust, Bunt, and Black Chaff in Spring-Wheat Crosses.... 59–66
BANFIELD, W. M.—
Life History of the Crown-Gall Organism in Relation to Its Pathogenesis on the Red Raspberry.... 761–787

BANFIELD, W. M.—Continued. Page
RIKER, A. J.; KEITT, G. W.; and HILDEBRAND, E. M.: Hairy Root, Crown Gall, and Other Malformations at the Unions of Piece-Root-Grafted Apple Trees and Their Control.... 913–939
Barberries, inoculation with teliospores of *Puccinia graminis* in study of new physiologic forms.... 953, 954, 962–965
Barberry, relation to origin and persistence of physiologic forms of *Puccinia graminis*. E. C. Stakman, M. N. Levine, Ralph U. Cotter, and Lee Hines.... 953–969
Bean, Black Valentine, inoculation with curly-top virus.... 666–668
Beans, snap—
injury from sprays, studies.... 447–451
retarded in growth by unfavorable soil conditions, injury from calcium arsenate hydrated lime spray. Loyd W. Brannon.... 447–451
BEAVENS, E. A., and JAMES, L. H.: The Microbial Decomposition of Successive Cuttings of Alfalfa Hay under Aerobic Conditions.... 1121–1126
Beef—
juice extraction, method and apparatus.... 1127–1134
muscle—
contents, analysis.... 1132–1134
heated, press fluid from. Alice M. Child and Mary Baldelli.... 1127–1134
roasted, press fluid from, methods of extraction.... 1130–1131
BENNETT, C. W.: Plant-Tissue Relations of the Sugar-Beet Curly-Top Virus.... 665–701
Beta vulgaris. *See* Sugar beet.
BLACK, ALEX, and VORIS, LEROY: A Statistical Study of the Relationships between the Constituents of Milk.... 1025–1032
Black—
chaff, of wheat. *See* Wheat, black chaff.
point disease of wheat, cause of increase of kernel weight. L. R. Waldron.... 1017–1024
BLAIR, A. W., and PRINCE, A. L.: The Influence of Lime on the Reaction of Subsoils.... 469–473
BLANK, L. M.: Uniformity in Pathogenicity and Cultural Behavior among Strains of the Cabbage-Yellows Organism.... 401–409
Blister-rust—
cankers, truncated, growth habits.... 1045–1047
mycelium, survival in western white pine. H. G. Lachmund and J. R. Hansbrough.... 1043–1047
white pine. See *Cronartium ribicola*.
Blood, bovine, influence of calcium phosphorus intake on. J. E. Greaves, E. J. Maynard, and Wendell Reeder.... 1033–1041
Blue-stain in timber, association with *Aphelenchoides xylophilus*, n. sp., a nematode. G. Steiner and Edna M. Buhrer.... 949–951
Bluegrass, Kentucky, manganese content, determination by new method.... 657–662
BOLIN, DONALD W.: The Manganese Content of Grasses and Alfalfa from Grazed Plots.... 657–663
Bone meal, effectiveness in dairy ration, comparison with phosphorus supplements in form of orthophosphoric acid, monosodium, disodium, and trisodium phosphates. William A. Turner, Edward B. Meigs, Edward A. Kane, Leo A. Shinn, and Walter S. Hale.... 619–630
Bones, leg, of chickens, development with respect to ash content. H. M. Harshaw, J. C. Fritz, and Harry W. Titus.... 997–1008
BOSWELL, VICTOR R., and JODIDI, SAMUEL L.: Chemical Composition and Yield of the Alaska Pea as Influenced by Certain Fertilizers and by the Stage of Development.... 703–736
BRANNON, LOYD W.: Injury from Calcium Arsenate-Hydrated Lime Spray on Snap Beans Retarded in Growth by Unfavorable Soil Conditions.... 447–451

Page

Brassica oleracea, resistance to yellows, study 401–409
BRAZIE, D., and JOHNSON, O.: Comparative Value of Some Commercial Protein Supplements in the Rations of Growing Chicks 183–186
BREWBAKER, H. E.: Self-Fertilization in Sugar Beets as Influenced by Type of Isolator and Other Factors 323–337
Bromegrass, manganese content, determination by new method 657–662
BROWN, NELLIE A.: A Gall Similar to Crown Gall, Produced on *Gypsophila* by a New *Bacterium* 1099–1112
Brown-tail moth—
hyperparasites, studies 359–376
parasitism by *Zenillia libatrix* Panzer, a tachinid, on. Philip B. Dowden 97–114
BRYANT, REECE L., and SHARP, PAUL FRANCIS: Effect of Washing on the Keeping Quality of Hens' Eggs 67–89
BUHRER, EDNA M., and STEINER, G.: *Aphelenchoides xylophilus*, N. Sp., a Nematode Associated with Blue-Stain and Other Fungi in Timber 949–951
Bull, genital organs, accessory, anatomy of 941–947
Bulls, dairy, artificial insemination, method and value 943–947
Bunt, inheritance of reaction to—
in spring-wheat crosses. H. K. Hayes, E. R. Ausemus, E. C. Stakman, and R. H. Bamberg 59–66
studies 34–36, 37, 45–46, 54, 61, 63
BUNYEA, HUBERT: Comparison of the Pullorin and the Rapid Whole-Blood Agglutination Tests for Pullorum Disease 837–843
BURK, DEAN, and HORNER, C. KENNETH: Magnesium, Calcium, and Iron Requirements for Growth of *Azotobacter* in Free and Fixed Nitrogen 981–995
Butterfat, relationship to other constituents of milk 1026–1031

Cabbage—
clubroot, soil treatment in relation to. R. H. Larson and J. C. Walker 749–759
strains, inoculation with *Fusarium conglutinans* 403–407, 408
yellows—
organism, strains of, uniformity in pathogenicity and cultural behavior. L. M. Blank 401–409
See also *Fusarium conglutinans*.
Cages—
improved, for studying Japanese beetle, development 120–122
use in selfing sugar beets, experiments. 324, 325–337
Calcification, properties of green, artificially dried, and sun-cured pasture herbage. R. E. Hodgson and J. C. Knott 439–446
Calcium—
arsenate-hydrated lime spray, injury to snap beans retarded in growth by unfavorable soil conditions. Loyd W. Brannon 447–451
content—
ash of chicken tibia 1004–1005
blood serum of chickens 1000–1001
bovine blood, study 1033–1040
phosphorus—
balance, ration of dairy cows, relation to phosphorus deficiency. W. H. Riddell, J. S. Hughes, and J. B. Fitch 167–170
intake, influence on bovine blood. J. E. Greaves, E. J. Maynard, and Wendell Reeder 1033–1041
requirements for growth of *Azotobacter* in free and fixed nitrogen experiments 983–998
CALDWELL, RALPH M.; KRAYBILL, H. R.; SULLIVAN, J. T., and COMPTON, LEROY E.: Effect of Leaf Rust (*Puccinia triticina*) on Yield, Physical Characters, and Composition of Winter Wheats 1049–1071
Candling apparatus, for use in chick embryological studies, description 518–519, 520

Page

Cankers—
blister-rust, truncated, growth habits 1045–1047
Cronartium ribicola, growth and injurious effects on *Pinus monticola*. H. G. Lachmund 475–503
Capsicum frutescens—
flower—
and fruit abnormalities. H. L. Cochran 737–748
teratological transitions 739–742
fruit—
and flowers, normal and abnormal, histological differentiations 743–746
teratological transformations 742–743
Carbon dioxide—
distribution in mushroom compost heaps, study 589–590
formation by clean and scabby potatoes. B. F. Lutman 1135–1144
Carcelia lazifrons, parasitization by hyperparasites 373–374, 375
Carpocapsa pomonella. *See* Codling moth.
Carrot root, infection by *Armillaria mellea*, cytological study 202
Cattle—
aphosphorosis, effects, study 167–170
blood, influence of calcium phosphorus intake on. J. E. Greaves, E. J. Maynard, and Wendell Reeder 1033–1041
Cauliflower, inoculation with *Fusarium conglutinans*, results 406–407, 408
CAVERS, J. R., and HUTT, F. B.: The Relation Between Abnormal Orientation of the 4-Day Embryo and Position of the Chick at Hatching 517–531
Cercospora diazu—
cause of frog-eye on soybeans, study 131–147
inoculation of soybean stems, pods, and seeds, experiments 140–141
Miura, on soybean stems, pods, and seeds, relation of these infections to recurrence of the disease. Samuel G. Lehman 131–147
overwintering on infected soybean debris 142–144
Chaetexorista javana, parasitism on oriental moth 374, 375
Chick—
embryo—
4-day, relation to abnormal orientation of position of chick at hatching. J. R. Cavers and F. B. Hutt 517–531
malpositions at hatching, studies 517–518, 524–530
mortality, relation to orientation 522–523
orientation, determination, procedure 518–520
orientations, distribution, studies 520–522
position at hatching, relation to abnormal orientation of 4-day embryo. J. R. Cavers and F. B. Hutt 517–531
Chickens—
blood serum, calcium and phosphorus contents, study 1000–1001
feed consumption, relation to growth. Harry W. Titus, Morley A. Jull, and Walter A. Hendricks 817–835
growth as a function of feed consumption. Harry W. Titus, Morley A. Jull, and Walter A. Hendricks 817–835
leg bones—
ash content and physical character, comparison 1002–1004
normal development with respect to ash content. H. M. Harshaw, J. C. Fritz, and Harry W. Titus 997–1008
sex, effect on utilization of feed, study 817–820, 833
Chicks, growing, rations, comparative value of some commercial protein supplements. O. Johnson and D. Brazie 183–186
CHILD, ALICE M., and BALDELLI, MARY: Press Fluid from Heated Beef Muscle 1127–1134
Chlorophyll, action of *Bacterium tabacum* toxin on 414–415
Chromosome—
behavior, pollen mother cells of teosinte-corn hybrids 789–793
morphology, teosinte-corn hybrids, study 794–796, 800–804

Page

Chromosome—Continued.
selection, gametes of teosinte-corn hybrids, study ... 796–800, 802
Chromosomes in hybrids between *Euchlaena perennis* and *Zea mays*. A. E. Longley ... 789–806
CLARK, S. P.; HAWKINS, R. S.; SERVISS, GEO. H.; and HOBART, CHAS. A.: Varietal Differences in Cotton Boll Shedding as Correlated with Osmotic Pressure of Expressed Tissue Fluids ... 149–156
CLAYTON, E. E.: Toxin Produced by *Bacterium tabacum* and Its Relation to Host Range ... 411–426
Clover hay—
and corn ration, digestibility and biological value, experiments ... 557–569
ration, digestibility and biological value, experiments ... 557–569
Clubroot of cabbage, soil treatment in relation to. R. H. Larson and J. C. Walker ... 749–759
Cnidocampa flavescens, parasitization and hyperparasite, studies ... 359–360, 374
COCHRAN, H. L.: Abnormalities in the Flower and Fruit of *Capsicum frutescens* ... 737–748
Codling moth—
ability to enter apples, studies ... 533–552
Colorado and Virginia strains, ability to enter sprayed and unsprayed apples, study. Walter S. Hough ... 533–553
eggs and larvae, fumigation tests ... 548–550
larvae—
endurance of starvation ... 547–548
rejection of poisoned apple pulp ... 544–545
strains, studies ... 536–548
COFFMAN, F. A.; STANTON, T. R.; and REED, GEORGE M.: Inheritance of Resistance to Loose Smut and Covered Smut in Some Oat Hybrids ... 1073–1083
Colorado strains of codling moth, ability to enter sprayed and unsprayed apples, study. Walter S. Hough ... 533–553
Compost heaps, mushroom—
distribution of oxygen and carbon dioxide as affecting microbial thermogenesis, acidity, and moisture therein. Edmund B. Lambert and A. C. Davis ... 587–601
hydrogen-ion concentrations and moisture content of ... 596–597, 598
Compsilura concinnata, parasitization by hyperparasites ... 369–371, 375
COMPTON, LEROY E.; CALDWELL, RALPH M.; KRAYBILL, H. R.; and SULLIVAN, J. T.: Effect of Leaf Rust (*Puccinia triticina*) on Yield, Physical Characters, and Composition of Winter Wheats ... 1049–1071
Containers, plant, moisture from, absorption and evaporation. Linus H. Jones ... 511–516
Cork, formation in tubers infected by *Armillaria mellea* ... 205
Corn—
crossing values in second-generation lines ... 339–357
germination, effect of iarovization ... 1114–1116
iarovization experiments. George F. Sprague ... 1113–1120
proteins, in combination with proteins of alfalfa and clover hay, nutritive value. Kenneth L. Turk, F. B. Morrison, and L. A. Maynard ... 555–570
sexual maturity, hastening, experiments ... 1113–1119
teosinte hybrids, chromosomes, behavior, cytological study ... 789–805
See also Maize.
Corpuscles, red, infection by *Babesia* spp., studies ... 427–437
COTTER, RALPH U.; STAKMAN, E. C.; LEVINE, M. N.; and HINES, LEE: Relation of Barberry to the Origin and Persistence of Physiologic Forms of *Puccinia graminis* ... 953–969
Cotton—
boll, shedding, varietal differences as correlated with osmotic pressure of expressed tissue fluids. R. S. Hawkins, S. P. Clark, Geo. H. Serviss, and Chas. A Hobart ... 149–156

Page

Cotton—Continued.
tissue fluids, expressed, osmotic pressure of, correlation with varietal differences in boll shedding. R. S. Hawkins, S. P. Clark, Geo. H. Serviss, and Chas. A. Hobart ... 149–156
varieties, shedding differences, correlation studies ... 149–156
Cows—
dairy—
phosphorus deficiency, influence on coefficient of digestibility and balance of calcium and phosphorus. W. H. Riddell, J. S. Hughes, and J. B. Fitch ... 167–170
rations, supplements of phosphorus and bone meal, comparative effectiveness ... 619–630
metabolism, calcium and phosphorus, relation to alkaline variations in ration ... 619–630
Cronartium ribicola cankers—
growth and injurious effects on *Pinus monticola*. H. G. Lachmund ... 475–503
growth studies ... 478–497
in various areas, comparative studies ... 476–478
injurious effects, studies ... 491–501
Crossing, maize, values in second-generation lines. Robert L. Davis ... 339–357
Crown gall—
apple trees in the nursery, seasonal development. A. J. Riker and E. M. Hildebrand ... 887–912
organism, life history in relation to its pathogenesis on red raspberry. W. M. Banfield ... 761–787
piece-root-grafted apple trees, occurrence and control. A. J. Riker, G. W. Keitt, E. M. Hildebrand, and W. M. Banfield ... 913–939
similarity to gall produced on *Gypsophila* by a new *Bacterium*. Nellie A. Brown ... 1099–1112
Curly-top virus—
concentration in phloem exudate of plant tissues ... 678–679
sugar beet, plant-tissue relations of. C. W. Bennett ... 665–701

Dairy—
ration, supplements of phosphorus in form of orthophosphoric acid, monosodium, disodium, trisodium phosphates, and bone meal, comparative effectiveness. William A. Turner, Edward B. Meigs, Edward A. Kane, Leo A. Shinn, and Walter S. Hale ... 619–630
studies, physiological, spermatozoa for, technic for obtaining. Fred W. Miller and Everette I. Evans ... 941–947
DAVIS, A. C., and LAMBERT, EDMUND B.: Distribution of Oxygen and Carbon Dioxide in Mushroom Compost Heaps as Affecting Microbial Thermogenesis, Acidity, and Moisture Therein ... 587–601
DAVIS, ROBERT L.: Maize Crossing Values in Second-Generation Lines ... 339–357
Day length, relation to growth of timothy. Morgan W. Evans and H. A. Allard ... 571–586
Daylight—
effect on sexual maturity of corn ... 1117–1119
varying, effect upon growth of timothy, experiments ... 571–586
See also Light.
Decomposition, microbial, of successive cuttings of alfalfa hay under aerobic conditions. E. A. Beavens and L. H. James ... 1121–1126
Defoliators, lepidopterous, introduced species, hyperparasitism in. A. B. Proper ... 359–376
Dextrose, effect on—
coagulation of egg albumin ... 463–464
thermal resistance of bacteria, experiments ... 453–457, 459–463
Diastase digestion, in alfalfa, starch-sugar equilibrium, relation to seasonal differences ... 233–234

Page

Dibrachys boucheanus, hyperparasitism upon tree defoliators..... 361, 362, 365, 366, 367, 370
Diets, chickens, effect on ash content of leg bones, experiments..... 997-1007
Disodium phosphate, use as supplement of phosphorus in dairy ration, comparative effectiveness. William A. Turner, Ed-B. Meigs, Edward A. Kane, Leo A. Shinn, and Walter S. Hale..... 619-624
DOWDEN, PHILIP B.: *Zenillia libatrix* Panzer, a Tachinid Parasite of the Gypsy Moth and the Brown-Tail Moth..... 97-114
DULEY, F. L., and ACKERMAN, F. G.: Run-Off and Erosion from Plots of Different Lengths..... 505-510

Egg—
albumin, coagulation, effect of hypertonic sugar solutions on..... 463-464
shells, porosity, study..... 69, 70, 78, 85-86
white, germicidal action, experiments..... 80-81
Eggs—
bacterial count, factors affecting 80-83, 87
characters, effect of washing..... 84-85
cleaning, experimental methods..... 70-75, 81-83
hens', keeping quality, effect of washing. Reece L. Bryant and Paul Francis Sharp..... 67-89
washing, effect on keeping quality. Reece L. Bryant and Paul Francis Sharp..... 67-89
weight losses, factors causing..... 77-78, 79-80, 85
ELLIS, N. R.—
and HANKINS, O. G.: Physical Characteristics of Hog Carcasses as Measures of Fatness..... 257-264
WARNER, K. F., and HOWE, PAUL E.: Cutting Yields of Hogs an Index of Fatness..... 241-255
Enzymatic responses, alfalfa varieties, means of determination of hardiness. H. M. Tysdal..... 219-240
Enzymes, diastatic, in alfalfa, activity, relation to hardening-off..... 219-239
Erosion, from plots of different lengths. F. L. Duley and F. G. Ackerman..... 505-510
Escherichia coli, thermal resistance, effect of hypertonic sugar solutions on..... 453-461, 462
Euchlaena perennis × *Zea mays* hybrids, chromosomes. A. E. Longley..... 789-806
Eupteromalus nidulans—
hyperparasitism on tree defoliators.. 360-362, 365
parasitization by hyperparasites..... 368-369, 375
Eurytoma appendigaster, hyperparasitism upon tree defoliators..... 361, 362, 363, 365, 306, 370
EVANS, EVERETTE I., and MILLER, FRED W.: Technic for Obtaining Spermatozoa for Physiological Dairy Studies and Artificial Insemination..... 941-947
EVANS, MORGAN W., and ALLARD, H. A.: Relation of Length of Day to Growth of Timothy..... 571-586
Evaporation of moisture from plant containers. Linus H. Jones..... 511-516

Fatness—
hog carcasses, measurement by physical characteristics. O. G. Hankins and N. R. Ellis..... 257-264
hogs, index in cutting yields. K. F. Warner, N. R. Ellis, and Paul E. Howe..... 241-255
FAY, A. C.: The Effect of Hypertonic Sugar Solutions on the Thermal Resistance of Bacteria..... 453-468
Feed consumption, chickens, relation to growth. Harry W. Titus, Morley A. Jull, and Walter A. Hendricks..... 817-835
Fertilizers, influence on chemical composition and yield of Alaska pea. Samuel L. Jodidi and Victor R. Boswell..... 703-736
Fescue, meadow, manganese content, determination by new method..... 657-662
Field plot experiments, sweet potato, requirements in size, shape, and orientation, and number of replications required. Ross C. Thompson..... 379-399

Page

FITCH, J. B.; RIDDELL, W. H.; and HUGHES, J. S.: The Influence of Phosphorus Deficiency in Dairy Cows on the Coefficient of Digestibility and the Balance of Calcium and Phosphorus..... 167-170
FLEMING, WALTER E.: Development of a Standard Cage Method for Testing the Effectiveness of Stomach-Poison Insecticides on the Japanese Beetle..... 115-130
Flour beetle, confused, stages of, lethal effect of low temperatures. Roy H. Nagel and Harold H. Shepard..... 1009-1016
Flowerpots—
cement, absorption of water, experiment.. 512
clay, absorption of moisture, studies..... 511-513
moisture from, absorption and evaporation..... 511-516
porous and painted, evaporation of moisture from, studies..... 513-515
Fluid, muscle, pressing from heated beef, laboratory method..... 1127-1134
Forage, green and dried, calcifying properties, comparative studies..... 439-445
FREAR, DONALD E. H.: A Study of the Iodine Content of Pennsylvania Potatoes. 171-182
FRITZ, J. C.; HARSHAW, H. M.; and TITUS, HARRY W.: The Normal Development of the Leg Bones of Chickens with Respect to Their Ash Content..... 997-1008
Frog-eye—
fungus—
development on infected soybean seed, study..... 144-146
longevity..... 141-142, 147
on soybean stems, pods, and seeds, relation of infections to recurrence of disease. Samuel G. Lehman..... 131-147
Fumigation, codling-moth eggs, tests..... 548-550
Fungi, in timber, association with *Aphelenchoides xylophilus*, n. sp. G. Steiner and Edna M. Buhrer..... 949-951
Fusarium conglutinans—
cause of cabbage yellows, studies..... 401-409
isolates, source and pathogenicity..... 402-407
strains of, uniformity in pathogenicity and cultural behavior..... 401-409

Gall, similar to crown gall, production on *Gypsophila* by new *Bacterium*. Nellie A. Brown..... 1099-1112
Gelis spp., hyperparasitism upon tree defoliators..... 361, 362, 365, 366, 367, 368
Gladiolus—
corms—
curing temperature, effect on germination and flower production..... 280
germination, flower production, and yield after storage..... 270-273
loss in weight during storage..... 267-269
in storage, factors affecting. J. I. Lauritzen and R. C. Wright..... 265-282
rooting and sprouting during storage..... 269-270
suberization, effect on infection by *Penicillium gladioli*..... 277-280
wound-periderm formation, effect on infection by *Penicillium gladioli*..... 277-280
Goiter, incidence, relation to iodine content of potatoes, study..... 171, 180
Grass—
embryo, interpretations..... 283-285, 316
pasture, calcifying properties, comparison of green and dried herbage..... 439-445
Grasses, from grazed plots, manganese content. Donald W. Bolin..... 657-663
GREAVES, J. E.; MAYNARD, E. J.; and REEDER, WENDELL: Influence of Calcium Phosphorus Intake on Bovine Blood... 1033-1041
Gypsophila—
gall similar to crown gall on, production by new *Bacterium*. Nellie A. Brown.. 1099-1112
inoculation with *Bacterium gypsophilae*, n. sp., experiments..... 1101-1105
Gypsy moth—
hyperparasites, studies..... 359-376
parasitism by *Zenillia libatrix* Panzer, a tachinid, on. Philip B. Dowden..... 97-114

Page

Hagerstown clay loam soil, fertilized for growing apple trees in metal cylinders, distribution and condition of nitrogen in three horizons of. Walter Thomas..... 845–856
Hairy-neck character, transposition from *Secale* to *Triticum*, irregularities in inheritance. J. W. Taylor..... 603–617
Hairy root—
apple trees in the nursery, seasonal development. A. J. Riker and E. M. Hildebrand..... 887–912
infectious, identity studies..... 858–860
organism—
distribution and transmission..... 881–882
entrance into host, studies..... 860–874
life history, relation to pathogenesis on nursery apple trees. E. M. Hildebrand..... 857–885
location within host..... 875–879
on nursery apple trees, studies..... 857–883
soil relations..... 879–881
piece-root-grafted apple trees, occurrence and control. A. J. Riker, G. W. Keitt, E. M. Hildebrand, and W. M. Banfield..... 913–939
Hale, Walter S.; Turner, William A.; Meigs, Edward B.; Kane, Edward A.; and Shinn, Leo A.: The Comparative Effectiveness, in the Dairy Ration, of Supplements of Phosphorus in the Form of Orthophosphoric Acid, Monosodium, Disodium, Trisodium Phosphates, and Bone Meal..... 619–630
Hankins, O. G., and Ellis, N. R.: Physical Characteristics of Hog Carcasses as Measures of Fatness..... 257–264
Hansbrough, J. R., and Lachmund, H. G.: Survival of Blister-Rust Mycelium in Western White Pine..... 1043–1047
Harshaw, H. M.; Fritz, J. C.; and Titus, Harry W.: The Normal Development of the Leg Bones of Chickens with Respect to Their Ash Content..... 997–1008
Hawkins, R. S.; Clark, S. P.; Serviss, Geo. H.; and Hobart, Chas. A.: Varietal Differences in Cotton Boll Shedding as Correlated with Osmotic Pressure of Expressed Tissue Fluids..... 149–156
Hay—
alfalfa—
and corn ration, digestibility and biological value, experiments..... 557–569
microbial decomposition of successive cuttings under aerobic conditions. E. A. Beavens and L. H. James.... 1121–1126
proteins of, nutritive value when fed alone and in combination with the proteins of corn. Kenneth L. Turk, F. B. Morrison, and L. A. Maynard.. 555–570
ration, digestibility and biological value, experiments..... 557–569
successive cuttings under aerobic conditions, microbial decomposition of. E. A. Beavens and L. H. James..... 1121–1126
clover, proteins of, nutritive value when fed alone and in combination with the proteins of corn. Kenneth L. Turk, F. B. Morrison, and L. A. Maynard..... 555–570
Hayes, H. K.; Ausemus, E. R.; Stakman, E. C.; and Bamberg, R. H.: Correlated Inheritance of Reaction to Stem Rust, Leaf Rust, Bunt, and Black Chaff in Spring-Wheat Crosses..... 59–66
Hedera helix—
bacterial disease. Richard P. White and Lucia McCullough..... 807–815
bacterial disease, importance and symptoms..... 808–809
varieties, susceptibility to bacterial disease..... 809
Helminthosporium sativum, infection of wheat, effect on weight of kernels..... 1017–1024
Hemiteles tenellus, hyperparasitism upon tree defoliators..... 361, 362, 365, 366, 367–368
Hendricks, Walter A.; Titus, Harry W.; and Jull, Morley A.: Growth of Chickens as a Function of Feed Consumption..... 817–835

Page

Hildebrand, E. M.—
Life History of the Hairy-Root Organism in Relation to its Pathogenesis on Nursery Apple Trees..... 857–885
and Riker, A. J.: Seasonal Development of Hairy Root, Crown Gall, and Wound Overgrowth on Apple Trees in the Nursery..... 887–912
Riker, A. J.; Keitt, G. W.; and Banfield, W. M.: Hairy Root of Crown Gall, and Other Malformations at the Unions of Piece-Root-Grafted Apple Trees and Their Control..... 913–939
Hines, Lee; Stakman, E. C.; Levine, M. N.; and Cotter, Ralph U.: Relation of Barberry to the Origin and Persistence of Physiologic Forms of *Puccinia graminis*.. 953–969
Hobart, Chas. A.; Hawkins, R. S.; Clark, S. P.; and Serviss, Geo. H.: Varietal Differences in Cotton Boll Shedding as Correlated with Osmotic Pressure of Expressed Tissue Fluids..... 149–156
Hodgson, R. E., and Knott, J. C.: The Calcifying Properties of Green, Artificially Dried, and Sun-Cured Pasture Herbage.. 439–446
Hog carcasses, fatness, measurement by physical characteristics. O. G. Hankins and N. R. Ellis..... 257–264
Hogs, fatness, index in cutting yields. K. F. Warner, N. R. Ellis, and Paul E. Howe..... 241–255
Holland, E. B., and Jones, C. P.: The Relation of "Dark Center" to the Composition of Rutabagas..... 377–378
Horner, C. Kenneth, and Burk, Dean: Magnesium, Calcium, and Iron Requirements for Growth of *Azotobacter* in Free and Fixed Nitrogen..... 981–995
Hough, Walter S.: Colorado and Virginia Strains of Codling Moth in Relation to Their Ability to Enter Sprayed and Unsprayed Apples..... 533–553
Howe, Paul E.; Warner, K. F.; and Ellis, N. R.: Cutting Yields of Hogs an Index of Fatness..... 241–255
Hubbell, D. S.: Morphological Study of Blind and Flowering Rose Shoots, with Special Reference to Flower-Bud Differentiation..... 91–95
Hughes, J. S.; Riddell, W. H.; and Fitch, J. B.: The Influence of Phosphorus Deficiency in Dairy Cows on the Coefficient of Digestibility and the Balance of Calcium and Phosphorus..... 167–170
Humidity—
effect on—
Japanese beetles, experiments..... 120, 122, 124
selfing sugar beets..... 326–331, 336–337
storage, effect on development of *Penicillium gladioli*..... 273–280
Hutt, F. B., and Cavers, J. R.: The Relation between Abnormal Orientation of the 4-Day Embryo and Position of the Chick at Hatching..... 517–531
Hybrids between *Euchlaena perennis* and *Zea mays*, chromosomes. A. E. Longley.. 789–806
Hyperparasitism, in introduced lepidopterous defoliators. A. B. Proper..... 359–376

Iarovization—
definition..... 1113
of corn, experiments. George F. Sprague. 1113–1120
Ice cream—
mix, bacteria in, survival in hypertonic sugar medium..... 455–456
mixes, heating, effect on micro-organisms, study..... 453–467
Illumination, natural and artificial, effects on growth of timothy, comparison..... 585
Inheritance—
correlated, of reaction to—
diseases and of botanical characters in triangular wheat crosses. Elmer R. Ausemus..... 31–57
stem rust, leaf rust, bunt, and black chaff, in spring-wheat crosses. H. K. Hayes, E. R. Ausemus, E. C. Stakman, and R. H. Bamberg..... 59–66

Page

Inheritance—Continued.
hairy-neck character transposed from *Secale* and *Triticum*, irregularities. J. W. Taylor 603–617
resistance to loose smut—
and covered smut in some oat hybrids. T. R. Stanton, George M. Reed, and F. A. Coffman 1073–1083
of wheat crosses. D. C. Tingey and Bion Tolman 631–655
Insecticides, stomach-poison, effectiveness on the Japanese beetle, development of a standard cage method for testing. Walter E. Fleming 115–130
Insects, soil, influence on infection of apple roots by hairy-root organism 868–870, 891, 892–893, 935–936
Insemination, artificial, spermatozoa for, technic for obtaining from dairy bulls. Fred W. Miller and Everette I. Evans 941–947
Iodine content of—
Pennsylvania potatoes, study. Donald E. H. Frear 171–182
potatoes—
determination method 172–175
relationships 177–180
Ipomoea batatas. *See* Sweetpotatoes.
Iron requirements for growth of *Azotobacter* in free and fixed nitrogen, experiments 988–990
Irrigation, wheat, effect on yield of border rows 157–166
Isolator type, for sugar beets, influence on self-fertilization. H. E. Brewbaker 323–337
Ivy—
English, bacterial disease 807–815
varieties, susceptibility to bacterial disease 809

JAMES, L. H., and BEAVENS, E. A.: The Microbial Decomposition of Successive Cuttings of Alfalfa Hay under Aerobic Conditions 1121–1126
Japanese beetle—
cage for studying, development 120–122
stomach-poison insecticides on, development of a standard cage method for testing effectiveness. Walter E. Fleming 115–130
JODIDI, SAMUEL L., and BOSWELL, VICTOR R.: Chemical Composition and Yield of the Alaska Pea as Influenced by Certain Fertilizers and by Stage of Development 703–736
JOHNSON, O., and BRAZIE, D.: Comparative Value of Some Commercial Protein Supplements in the Rations of Growing Chicks 183–186
JONES, C. P., and HOLLAND, E. B.: The Relation of "Dark Center" to the Composition of Rutabagas 377–378
JONES, FRED REUEL: Testing Alfalfa for Resistance to Bacterial Wilt 1085–1098
JONES, LINUS H.: The Absorption and Evaporation of Moisture from Plant Containers 511–516
JULL, MORLEY A.; TITUS, HARRY W.; and HENDRICKS, WALTER A.: Growth of Chickens as a Function of Feed Consumption 817–835

Kale, inoculation with *Fusarium conglutinans*, results 406–407, 408
KANE, EDWARD A.; TURNER, WILLIAM A.; MEIGS, EDWARD B.; SHINN, LEO A.; and HALE, WALTER S.: The Comparative Effectiveness, in the Dairy Ration, of Supplements of Phosphorus in the Form of Orthophosphoric Acid, Monosodium, Disodium, Trisodium Phosphates, and Bone Meal 619–630
KEITT, G. W.; RIKER, A. J.; HILDEBRAND, E. M.; and BANFIELD, W. M.: Hairy Root, Crown Gall, and Other Malformations at the Unions of Piece-Root-Grafted Apple Trees, and Their Control 913–939
KNOTT, J. C., and HODGSON, R. E.: The Calcifying Properties of Green, Artificially Dried, and Sun-Cured Pasture Herbage 439–446

Page

Kohlrabi, inoculation with *Fusarium conglutinans*, results 406–407, 408
KOONCE, DWIGHT, and ROBERTSON, D. W.: Border Effect in Irrigated Plots of Marquis Wheat Receiving Water at Different Times 157–166
KRAYBILL, H. R.; CALDWELL, RALPH M.; SULLIVAN, J. T.; and COMPTON, LEROY E.: Effect of Leaf Rust (*Puccinia triticina*) on Yield, Physical Characters, and Composition of Winter Wheats 1049–1071

LACHMUND, H. G.—
Growth and Injurious Effects of *Cronartium ribicola* Cankers on *Pinus monticola* 475–503
and HANSBROUGH, J. R.: Survival of Blister-Rust Mycelium in Western White Pine 1043–1047
LAMBERT, EDMUND B.—
Size and Arrangement of Plots for Yield Tests with Cultivated Mushrooms 971–980
and DAVIS, A. C.: Distribution of Oxygen and Carbon Dioxide in Mushroom Compost Heaps as Affecting Microbial Thermogenesis, Acidity, and Moisture Therein 587–601
Lambs, feeding for nitrogen metabolism, experiments 557–569
LARSON, R. H., and WALKER, J. C.: Soil Treatment in Relation to Clubroot of Cabbage 749–759
LAURITZEN, J. I., and WRIGHT, R. C.: Factors Affecting *Gladiolus* in Storage 265–282
Lead arsenate, toxicity to Japanese beetle, testing by cage method 117–129
Leaf rust (*Puccinia triticina*), effect on yield, physical characters, and composition of winter wheats. Ralph M. Caldwell, H. R. Kraybill, J. T. Sullivan, and Leroy E. Compton 1049–1071
LEHMAN, SAMUEL G.: Frog-Eye (*Cercospora diazu* Miura) on Stems, Pods, and Seeds of Soybean, and the Relation of these Infections to Recurrence of the Disease 131–147
Lepidoptera, tree defoliators, hyperparasitism in introduced species of. A. B. Proper 359–376
LEVINE, M. N.; STAKMAN, E. C.; COTTER, RALPH U.; and HINES, LEE: Relation of Barberry to the Origin and Persistence of Physiologic Forms of *Puccinia graminis* 953–969
Light—
effect upon growth of timothy, experiments 571–586
response of Japanese beetle to, experiments 123–124
See also Daylight.
Lime—
calcium arsenate spray, injury to snap beans retarded in growth 447–451
influence on reaction of subsoils. A. W. Blair and A. L. Prince 469–473
Liming—
materials, effectiveness against clubroot of cabbage, studies 749–759
Sassafras loam, influence on reaction of subsoils, study 469–473
Loam, Sassafras, liming, effect on reaction of subsoils, study 469–473
LONGLEY, A. E.: Chromosomes in Hybrids between *Euchlaena perennis* and *Zea mays* 789–806
LUTMAN, B. F.: Carbon Dioxide Formation by Clean and Scabby Potatoes 1135–1144

Magnesium requirements for growth of *Azotobacter* in free and fixed nitrogen, experiments 983–998
Maize—
crossing values in second-generation lines. Robert L. Davis 339–357
See also Corn.
Manganese—
content, grasses and alfalfa from grazed plots. Donald W. Bolin 657–663
recovery from plant tissues, new method 657–662

Page

Manure, stable—
composted, aeration, temperature, moisture, and acidity, study ... 587–600
use in mushroom growing, experiments ... 587–600
MAYNARD, E. J.: GREAVES, J. E.; and REEDER, WENDELL: Influence of Calcium Phosphorus Intake on Bovine Blood ... 1033–1041
MAYNARD, L. A.; TURK, KENNETH L.; and MORRISON, F. B.: The Nutritive Value of the Proteins of Alfalfa Hay and Clover Hay When Fed Alone and in Combination with the Proteins of Corn ... 555–570
MCCALL, M. A.: Developmental Anatomy and Homologies in Wheat ... 283–321
MCCULLOUGH, LUCIA, and WHITE, RICHARD P.: A Bacterial Disease of *Hedera helix* ... 807–815
Meat, juiciness, descriptive terms ... 1127
Medicago sativa. *See* Alfalfa.
MEIGS, EDWARD B.; TURNER, WILLIAM A.; KANE, EDWARD A.; SHINN, LEO A.; and HALE, WALTER S.: The Comparative Effectiveness, in the Dairy Ration, of Supplements of Phosphorus in the Form of Orthophosphoric Acid, Monosodium, Disodium, Trisodium Phosphates, and Bone Meal ... 619–630
Metabolism—
calcium and phosphorus, of cows, effect of alkaline variations in ration ... 619–630
nitrogen, in lambs, studies ... 556–569
Meteorus versicolor, parasitization by hyperparasites, study ... 366–368, 375
Microbial decomposition of successive cuttings of alfalfa hay under aerobic conditions. E. A. Beavens and L. H. James ... 1121–1126
Milk—
bacteria in, survival in hypertonic sugar medium ... 456–457
composition, changes, observations ... 1025–1031
constituents—
correlation coefficients ... 1029–1031
relationships between, statistical study. Alex Black and LeRoy Voris ... 1025–1032
MILLER, FRED W., and EVANS, EVERETTE, I.: Technic for Obtaining Spermatozoa for Physiological Dairy Studies and Artificial Insemination ... 941–947
Millet, iarovization, experiment ... 1118
Moisture—
absorption and evaporation from plant containers. Linus H. Jones ... 511–516
mushroom compost heaps, effect of distribution of oxygen and carbon dioxide therein. Edmund B. Lambert and A. C. Davis ... 587–601
soil, effect upon liming against clubroot of cabbage, experiments ... 756–758
Monodontomerus aereus, hyperparasitism upon tree defoliators ... 361, 366, 370, 371, 372, 374
Monosodium phosphate, use as supplement of phosphorus in dairy ration, comparative effectiveness. William A. Turner, Edward B. Meigs, Edward A. Kane, Leo A. Shinn, and Walter S. Hale ... 619–624
MORRISON, F. B.; TURK, KENNETH L.; and MAYNARD, L. A.: The Nutritive Value of the Proteins of Alfalfa Hay and Clover Hay When Fed Alone and in Combination with Proteins of Corn ... 555–570
Muscle of beef, heated, press fluid from. Alice M. Child and Mary Baldelli ... 1127–1134
Mushroom—
compost heaps, distribution of oxygen and carbon dioxide as affecting microbial thermogenesis, acidity, and moisture therein. Edmund B. Lambert and A. C. Davis ... 587–601
culture, plot technic, experiments ... 971–980
growing, uniformity trials ... 972–980
Mushrooms—
cultivated, yield tests, size and arrangement of plots. Edmund G. Lambert ... 971–980
growth and yield, composting for, discussion ... 599–600
Myrobalan root, resistance to *Armillaria mellea*, cytological study ... 199, 202–203, 211

Page

NAGEL, ROY H., and SHEPARD, HAROLD H.: The Lethal Effect of Low Temperatures on the Various Stages of the Confused Flour Beetle ... 1009–1016
Nematode, timber, association with bluestain and other fungi ... 949–951
Nicotiana—
glauca, curly-top virus movement in, studies ... 685–687
spp., susceptibility to tobacco wildfire disease ... 421
tabacum. *See* Tobacco.
Nitrogen—
distribution and condition in three horizons of a differentially fertilized Hagerstown clay loam soil planted to apple trees in metal cylinders. Walter Thomas ... 845–856
fertilizers, effect on Alaska pea culture, experiments ... 703–735
free and fixed, growth of *Azotobacter* in, magnesium, calcium, and iron requirements. C. Kenneth Horner and Dean Burk ... 981–995
metabolism in lambs, studies ... 556–569
Nutritive value, proteins of alfalfa hay and clover hay when fed alone and in combination with proteins of corn. Kenneth L. Turk, F. B. Morrison, and L. A. Maynard ... 555–570
Nygmia phaeorrhoea. *See* Brown-tail moth.

Oat—
hybrids, inheritance of resistance to loose smut and covered smut. T. R. Stanton, George M. Reed, and F. A. Coffman ... 1073–1083
varieties, infection caused by forms of *Puccinia graminis avenae* ... 961
Oatgrass, tall, manganese content, determination by new method ... 657–662
Oats, breeding for resistance to smuts, studies ... 1073–1082
Orchard grass, manganese content, determination by new method ... 657–662
Oriental moth, parasitization and hyperparasite, studies ... 359–360, 374
Orthophosphoric acid, use as supplement of phosphorus in dairy ration, comparative effectiveness. William A. Turner, Edward B. Meigs, Edward A. Kane, Leo A. Shinn, and Walter S. Hale ... 619–624
Oxygen, distribution in mushroom compost heaps, study ... 589–590, 598

Parasite, tachinid, of gypsy moth and brown-tail moth, *Zanillia libatrix* Panzer. Philip B. Dowden ... 97–114
Parasites, imported, destruction by hyperparasites, study ... 359–376
Pasture herbage—
artificially dried, calcifying properties. R. E. Hodgson and J. C. Knott ... 439–446
green, calcifying properties. R. E. Hodgson and J. C. Knott ... 439–446
sun-cured, calcifying properties. R. E. Hodgson and J. C. Knott ... 439–446
Pea, Alaska—
chemical composition of, influence of certain fertilizers and stage of development. Samuel L. Jodidi and Victor R. Boswell ... 703–736
fertilizer experiments at Arlington Experiment Farm, Va ... 703–735
quality, effect of certain fertilizers on, experiments ... 703–735
stage of development, effect on chemical composition and yield. Samuel L. Jodidi and Victor R. Boswell ... 703–736
yields, influence of certain fertilizers and stage of development. Samuel L. Jodidi and Victor R. Boswell ... 703–736
Peach, susceptibility to *Armillaria mellea*, studies ... 192, 208, 211
Pear, French, resistance to *Armillaria mellea*, studies ... 196–198, 203, 211, 214–215
Penicillium infection of gladiolus in storage ... 273–280
Pennsylvania, potatoes, iodine content of, study. Donald E. H. Frear ... 171–182
Pepper, flowers and fruit, abnormalities in, studies ... 737–747

Page

Phaseolus vulgaris. *See* Beans, snap.
Phleum pratense. *See* Timothy.
Phloem tissue, reservoir of curly-top virus, study 665–666, 673, 675, 678–679, 680–687, 695–700
Phosphorus—
  balances, in cows, study 622–630
  calcium balance, ration of dairy cows, relation to phosphorus deficiency. W. H. Riddell, J. S. Hughes, and J. B. Fitch 167–170
  content of—
    ash of chicken tibia 1004–1005
    bovine blood, study 1033–1040
  deficiency in dairy cows, influence on coefficient of digestibility and balance of calcium and phosphorus. W. H. Riddell, J. S. Hughes, and J. B. Fitch 167–170
  fertilizers, effect on Alaska pea culture, experiments 703–735
  inorganic, content of blood serum of chickens 1000–1001
  supplements to dairy ration, effectiveness, comparison of orthophosphoric acid, monosodium, disodium, trisodium phosphates, and bone meal. William A. Turner, Edward B. Meigs, Edward A. Kane, Leo A. Shinn, and Walter S. Hale 619–630
Photoperiodism—
  experiments with timothy 571–586
  See also Daylight; Light.
Phytomonas—
  insidiosa, cause of bacterial wilt of alfalfa. 1085
  rhizogenes. *See* Hairy-root organism.
  tumefaciens—
    dissemination 766–769
    entrance into host, study 769–778
    exit from host 761–764
    incubation periods and seasonal development 778–784
    life history in relation to its pathogenesis on red raspberry 761–784
    longevity and overwintering in soil. ... 764–766
Pine—
  western white—
    blister-rust mycelium, survival. H. G. Lachmund and J. R. Hansbrough. 1043–1047
    See also *Pinus monticola*.
  white, blister rust. See *Cronartium ribicola*.
Pinus monticola, growth and injurious effects of *Cronartium ribicola* cankers on. H. G. Lachmund 475–503
Piroplasms, *Babesia argentina* and *B. bigemina*, characteristics in the United States. Charles W. Rees 427–438
Pisum sativum. *See* Pea, Alaska.
Plant—
  containers, moisture from, absorption and evaporation. Linus H. Jones 511–516
  tissue relations of the sugar-beet curly-top virus. C. W. Bennett 665–701
  tissues, action of *Bacterium tabacum* toxin on 414–415
Plasmodiophora brassicae, infection of cabbage, control experiments 749–759
Pleurotropis spp., hyperparasitism upon tree defoliators 351, 352, 365, 368–369, 370
Plots—
  of different lengths, run-off and erosion from. F. L. Duley and F. G. Ackerman 505–510
  sweetpotato, size, shape, and orientation, and number of replications required in field-plot experiments. Ross C. Thompson 379–399
Pollen mother cells, teosinte-corn hybrids, chromosome behavior 789–793
Popillia japonica. *See* Japanese beetle.
Pork carcass—
  fatness—
    determination, measurement methods. 241–242, 258–260
    index in cutting yields 241–255
    measurement by physical characteristics 257–264
    measurement method 258–260
Porthetria dispar. *See* Gypsy moth.

Page

Potash fertilizers, effect on Alaska pea culture, experiments 703–735
Potassium cyanide, use in codling-moth control, test 548–550
Potato tuber, infection by *Armillaria mellea*, cytological study 201–202
Potatoes—
  clean, formation of carbon dioxide by. B. F. Lutman 1135–1144
  iodine content—
    in Pennsylvania, study. Donald E. H. Frear 171–182
    relation to—
      geographical distribution 177
      incidence of goiter, study 171, 180
      soil type 177–178
      variety and size 179
  scabby, formation of carbon dioxide by. B. F. Lutman 1135–1144
  storage, respiration studies 1135–1143
Press fluid, from heated beef muscle. Alice M. Child and Mary Paldel'i 1127–1134
Pressometer, description and use in meat studies 1127–1134
PRINCE, A. L., and BLAIR, A. W.: The Influence of Lime on the Reaction of Subsoils. 469–473
PROPER, A. B.: Hyperparasitism in the Case of Some Introduced Lepidopterous Tree Defoliators 359–376
Protein—
  content of wheat, effect of leaf rust 1052–1053, 1059–1063, 1067–1069
  supplements, commercial, in rations of growing chicks, comparative value. O. Johnson and D. Brazie 183–186
Proteins, alfalfa and clover hay, feeding alone and in combination with corn proteins, nutritive value. Kenneth L. Turk, F. B. Morrison, and L. A. Maynard 555–570
Prune, infection by *Armillaria mellea*, cytological study 206–207
Pruning, apricot trees, severity, correlations with subsequent growth and fruit yield. H. S. Reed 1–30
Prunus spp., infection by *Armillaria mellea*, formation of gum cavities 205–207
Pseudomonas fluorescens, thermal resistance, effect of hypertonic sugar solutions on 461–462
Puccinia—
  graminis—
    avenae, physiologic forms, isolation and infection of oats 961–962, 964–967
    physiologic forms, identity and number 966
    physiologic forms, origin and persistence, relation of barberry to. E. C. Stakman, M. N. Levine, Ralph U. Cotter, and Lee Hines 953–969
    secalis, physiologic forms, isolation and infection of rye 960–961, 964–967
    tritici, physiologic forms, isolation and infection of wheat 956–959, 964–967
    varieties, isolation from aecial and uredial material 954–956
    See also Wheat stem rust.
  triticina—
    effect on yield, physical characters, and composition of winter wheats. Ralph M. Caldwell, H. R. Kraybill, J. T. Sullivan, and Leroy E. Compton ... 1049–1071
    See also Wheat leaf rust.
Puerto Rico, corn breeding experiment at Mayaguez Station 339–357
Pullorin—
  preparation methods 838–839
  test, comparison with rapid whole-blood agglutination test for pullorum disease. Hubert Bunyea 837–843
Pullorum disease, tests, rapid whole-blood agglutination and pullorin, comparison. Hubert Bunyea 837–843

Raspberry—
  red, crown-gall organism, life history in relation to its pathogenesis. W. M. Banfield 761–787
  roots, infection by crown-gall organism, study 769–784

Page

Ration—
cows, alkalinity variations, effect on calcium and phosphorus metabolism, study 619–630
dairy, supplements of phosphorus in form of orthophosphoric acid, monosodium, disodium, trisodium phosphates, and bone meal, comparative effectiveness. William A. Turner, Edward B. Meigs, Edward A. Kane, Leo A. Shinn, and Walter S. Hale 619–630
phosphorus-deficient, of dairy cows, effect on coefficient of digestibility and balance of calcium and phosphorus. W. H. Riddell, J. S. Hughes, and J. B. Fitch 167–170
Rations, chicks, commercial protein supplements in, comparative value. O. Johnson and D. Brazie 183–186
Redtop, manganese content, determination by new method 657–662
REED, GEORGE M.; STANTON, T. R.; and COFFMAN, F. A.: Inheritance of Resistance to Loose Smut and Covered Smut in Some Oat Hybrids 1073–1083
REED, H. S.: Correlations between Severity of Pruning and Subsequent Growth and Fruit Yield of Apricot Trees 1–30
REEDER, WENDELL; GREAVES, J. E.; and MAYNARD, E. J.: Influence of Calcium Phosphorus Intake on Bovine Blood 1033–1041
REES, CHARLES W.: Characteristics of the Piroplasms *Babesia argentina* and *B. bigemina* in the United States 427–438
Rennin, inactivation by heat, effect of various solutes on 464–465
Respiration, potatoes in storage, comparative studies 1135–1143
RIDDELL, W. H.; HUGHES, J. S.; and FITCH, J. B.: The Influence of Phosphorus Deficiency in Dairy Cows on the Coefficient of Digestibility and the Balance of Calcium and Phosphorus 167–170
RIKER, A. J.—
and HILDEBRAND, E. M.: Seasonal Development of Hairy Root, Crown Gall, and Wound Overgrowth on Apple Trees in the Nursery 887–912
KEITT, G. W.; HILDEBRAND, E. M.; and BANFIELD, W. M.: Hairy Root, Crown Gall, and Other Malformations at the Unions of Piece-Root-Grafted Apple Trees and Their Control 913–939
ROBERTSON, D. W., and KOONCE, DWIGHT: Border Effect in Irrigated Plots of Marquis Wheat Receiving Water at Different Times 157–166
Rootstocks, infection by *Armillaria mellea*, study 187–216
Rose—
flower-bud differentiation in blind and flowering shoots, morphological study. D. S. Hubbell 91–95
plants, forcing, effect on flower production, studies 91–95
shoots, blind and flowering, morphological study with special reference to flower-bud differentiation. D. S. Hubbell 91–95
Run-off, from plots of different lengths. F. L. Duley and F. G. Ackerman 505–510
Rust—
leaf (*Puccinia triticina*), effect on yield, physical characters, and composition of winter wheats. Ralph M. Caldwell, H. R. Kraybill, J. T. Sullivan, and Leroy E. Compton 1049–1071
See also *under specific host*.
Rutabagas—
composition, relation of "dark center" to. E. B. Holland and C. P. Jones 377–378
"dark center", description 377
"dark center", relation to composition of roots. E. B. Holland and C. P. Jones 377–378
normal and with dark centers, chemical analyses 377–378
Rye—
hairy-neck character—
pollination experiments 614–615, 617
transposition to wheat, irregularities 603–617

Page

Rye—Continued.
inbreeding for hairy-neck character 606–608
manganese content, determination by new method 657–662
varieties, infection caused by forms of *Puccinia graminis secalis* 962
wheat hybrids—
back-crossing with wheat, results 613–614
hairy neck in, effect on plant characters 610–613
inheritance of hairy neck 608–610

Salmonella pullorum—
presence in fowls, tests for, comparison 837–843
thermal resistance, effect of hypertonic sugar solutions on 461
Satin moth, hyperparasites, studies 359–376
Secale—
breeding for transfer of hairy-neck character, studies 603–617
hairy-neck character, transposition to *Triticum*, irregularities in inheritance. J. W. Taylor 603–617
Self-fertilization in sugar beets, influence of type of isolator and other factors. H. E. Brewbaker 323–337
Semen, dairy bulls, collection method 943–947
Serratia marcescens, thermal resistance, effect of hypertonic sugar solutions on 461–462
SERVISS, GEO. H.; HAWKINS, R. S.; CLARK, S. P.; and HOBART, CHAS. A.: Varietal Differences in Cotton Boll Shedding as Correlated with Osmotic Pressure of Expressed Tissue Fluids 149–156
Sex, chickens, effect of utilization of feed, study 817–820, 833
SHARP, PAUL FRANCIS, and BRYANT, REECE L.: Effect of Washing on the Keeping Quality of Hens' Eggs 67–89
SHEPARD, HAROLD H., and NAGEL, ROY H.: The Lethal Effect of Low Temperatures on the Various Stages of the Confused Flour Beetle 1009–1016
SHINN, LEO A.; TURNER, WILLIAM A.; MEIGS, EDWARD B.; KANE, EDWARD A.; and HALE, WALTER S.: The Comparative Effectiveness, in the Dairy Ration, of Supplements of Phosphorus in the Form of Orthophosphoric Acid, Monosodium, Disodium, Trisodium Phosphates, and Bone Meal 619–630
Slopes, length, effect on run-off and soil erosion, data 506–509
Smut, loose—
and covered, in oat hybrids, inheritance of resistance to. T. R. Stanton, George M. Reed, and F. A. Coffman 1073–1083
of wheat, inheritance of resistance to. D. C. Tingey and Bion Tolman 631–655
Soil—
aeration, effect upon liming against clubroot of cabbage, experiments 758
conditions, unfavorable, effect on growth of snap beans injured by calcium arsenate-hydrated lime spray. Loyd W. Brannon 447–451
erosion, from plots of different lengths 505–510
Hagerstown clay loam, fertilized, for growing apple trees in metal cylinders, distribution and condition of nitrogen in three horizons of. Walter Thomas 845–856
heterogeneity and variability, determination in field-plot experiments 394–396
inoculation with crown-gall organism, experiments 765, 771–772, 778, 779–782
moisture, effect upon liming against clubroot of cabbage, experiments 756–758
relation to hairy-root organism, studies 879–881
treatment in relation to clubroot of cabbage. R. H. Larson and J. C. Walker 749–759
type, Pennsylvania, relation to iodine content of potatoes 177–178
See also Subsoils.
Soja max. *See* Soybean.
Soybean—
inoculation with *Cercospora diazu*, experiments 140–141
pods, frog-eye on, and relation of infections to recurrence of the disease. Samuel G. Lehman 131–147

Page

Soybean—Continued.
seeds, frog-eye on, and the relation of infections to recurrence of the disease. Samuel G. Lehman 131–147
stems, frog-eye on, and relation of infections to recurrence of the disease. Samuel G. Lehman 131–147
Spermatozoa, for physiological dairy studies and artificial insemination, technic for obtaining. Fred W. Miller and Everette I. Evans 941–947
SPRAGUE, GEORGE F.: Experiments on larovizing Corn 1113–1120
Spray, arsenical, injury to snap beans grown under unfavorable soil conditions, study 447–451
Squash, inoculation with curly-top virus 666–668
STAKMAN, E. C.—
HAYES, H. K.; AUSEMUS, E. R.; and BAMBERG, R. H.: Correlated Inheritance of Reaction to Stem Rust, Leaf Rust, Bunt, and Black Chaff in Spring-Wheat Crosses 59–66
LEVINE, M. N.; COTTER, RALPH U.; and HINES, LEE: Relation of Barberry to the Origin and Persistence of Physiologic Forms of *Puccinia graminis* 953–969
STANTON, T. R.; REED, GEORGE M.; and COFFMAN, F. A.: Inheritance of Resistance to Loose Smut and Covered Smut in Some Oat Hybrids 1073–1083
Staphylococcus—
albus, thermal resistance, effect of hypertonic sugar solutions on 461
aureus, thermal resistance, effect of hypertonic sugar solutions on 461–462
Starch, content of wheat, effect of leaf rust 1064, 1066
Steers, blood, influence of calcium phosphorus intake on 1033–1040
STEINER, G., and BUHRER, EDNA M.: *Aphelenchoides xylophilus*, N. Sp., a Nematode Associated with Blue-Stain and Other Fungi in Timber 949–951
Stem rust—
of wheat. *See* Wheat stem rust.
relation of barberry to 953–968
Stilpnota salicis, hyperparasites, studies 359–376
Stomach-poison insecticides, effectiveness on Japanese beetle, development of a standard-cage method for testing. Walter E. Fleming 115–130
Sturmia—
nidicola, parasitization by hyperparasites 371–372, 375
scutellata, parasitization by hyperparasites, study 372–373, 375
Suberization, gladiolus, effect on infection by *Penicillium gladioli* 277–280
Subsoils, reaction to liming. A. W. Blair and A. L. Prince 469–473
Sucrose—
content of wheat, effect of leaf rust 1064, 1065
effect on—
coagulation of egg albumin 463–464
inactivation of rennin by heat 464–465
thermal resistance of bacteria, experiments 453–467
Sugar—
addition to ice-cream mix, effect on thermal resistance of microflora 453–467
solutions, hypertonic, effect on thermal resistance of bacteria. A. C. Fay 453–468
Sugar beet—
curly-top virus, plant-tissue relations of. C. W. Bennett 665–701
leaf hopper—
feeding habits, description 668–673
food, virus content 674–678, 699
mortality on different types of beet tissue, studies 674–676
seedlings, curly-top virus movement in, studies 692–693
tissue, curly-top virus movement in, studies 679, 692–694, 697–698
Sugar beets—
bagging studies 324, 325–337
caging studies 324, 325–337
inoculation with curly-top virus, experiments 666–668, 695

Page

Sugar beets—Continued.
seed setting, physiological factors affecting 332–337
self-fertilization, influence of type of isolator and other factors. H. E. Brewbaker 323–337
SULLIVAN, J. T.; CALDWELL, RALPH M.; KRAYBILL, H. R.; and COMPTON, LEROY E.: Effect of Leaf Rust (*Puccinia triticina*) on Yield, Physical Characters, and Composition of Winter Wheats 1049–1071
Sweetpotato field-plot experiments, requirements in size, shape, and orientation of plots and number of replications. Ross C. Thompson 379–390
Sweetpotatoes, growing in—
Maryland, Beltsville area, field-plot tests 381–382, 384–387, 388–390
South Carolina, Florence, field-plot tests 382–383, 386, 387–388, 390–398

Tachina mella, parasitization by *Monodontomerus aereus* 374, 375
TAYLOR, J. W.: Irregularities in the Inheritance of the Hairy-Neck Character Transposed from *Secale* to *Triticum* 603–617
Temperature—
effect on—
Japanese beetles, experiments 119–120, 122, 124
larvae of codling moth 543–544
selfing sugar beets 332
mushroom compost heaps, study 590–596, 598, 599–600
storage, effect on development of *Penicillium gladioli* 273–280
Temperatures, low, lethal effect on various stages of confused flour beetle. Roy H. Nagel and Harold H. Shepard 1009–1016
Teosinte—
corn hybrids—
aberrent plants, study 793–794, 801–803
chromosomes, behavior, cytological study 789–805
gametes of, chromosome selection 796–800, 802
larovizatic n experiments 1113–1119
Thermogenesis, microbial, in mushroom compost heaps, effect of distribution of oxygen and carbon dioxide therein. Edmund B. Lambert and A. C. Davis 587–601
THOMAS, HAROLD E.: Studies on *Armillaria mellea* (Vahl) Quel., Infection, Parasitism, and Host Resistance 187–218
THOMAS, WALTER: The Distribution and Condition of Nitrogen in Three Horizons of a Differentially Fertilized Hagerstown Clay Loam Soil Planted to Apple Trees in Metal Cylinders 845–856
THOMPSON, ROSS C.: Size, Shape, and Orientation of Plots and Number of Replications Required in Sweetpotato Field-Plot Experiments 379–399
Tilletia tritici. *See* Bunt.
Timber, blue-stain and fungi in, association with *Aphelenchoides xylophilus*, n. sp., a nematode. G. Steiner and Edna M. Buhrer 949–951
Timothy—
earliness and lateness, significance 585
flowering time, effect of day length on 575–577
growth, relation to length of day. Morgan W. Evans and H. A. Allard 571–586
manganese content, determination by new method 657–662
stems, characteristics, effect of day length on 581–582
TINGEY, D. C., and TOLMAN, BION: Inheritance of Resistance to Loose Smut in Certain Wheat Crosses 631–655
TITUS, HARRY W.—
HARSHAW, H. M., and FRITZ, J. C.: The Normal Development of the Leg Bones of Chickens with Respect to Their Ash Content 997–1008
JULL, MORLEY A., and HENDRICKS, WALTER A.: Growth of Chickens as a Function of Feed Consumption 817–835
Tobacco—
tissue, curly-crop virus movement in, studies 679–680, 696–697, 700

Page

Tobacco—Continued.
toxin production by *Bacterium tabacum* and its relation to host range ... 411–425
Turkish—
inoculation with curly-top virus ... 666–668
stems, curly-top virus movement in, studies ... 681–685, 690–692
wildfire disease, toxin, relationship to host range ... 411–425
TOLMAN, BION, and TINGEY, D. C.: Inheritance of Resistance to Loose Smut in Certain Wheat Crosses ... 631–655
Tomato stems, inoculation with crown-gall organism ... 766
Toxin, properties and action on plant tissues ... 412–415
Tree—
defoliators, lepidopterous, hyperparasitism in introduced species of. A. B. Proper ... 359–376
seedlings, infection by *Armillaria mellea*, cytology ... 202–207
Tribolium confusum—
adults, effect of low temperatures on ... 1014–1015
eggs, cold resistance, influence of age on ... 1011–1012, 1015
larvae, cold resistance, influence of age on ... 1012–1013, 1015
pupae, effect of low temperatures on ... 1013, 1015
Trisodium phosphate, use as supplement of phosphorus in dairy ration, comparative effectiveness. William A. Turner, Edward B. Meigs, Edward A. Kane, Leo A. Shinn, and Walter S. Hale ... 619–624
Triticum—
breeding for transfer of hairy-neck character, studies ... 603–617
hairy-neck character, transposition from *Secale*, irregularities in inheritance. J. W. Taylor ... 603–617
vulgare. *See* Wheat.
Trypan blue, effect upon *Babesia* spp., experiments ... 429, 435–436
Tubers, infection by *Armillaria mellea*, study ... 192–195, 199–202, 211–215
TURK, KENNETH L.; MORRISON, F. B.; and MAYNARD, L. A.: The Nutritive Value of the Proteins of Alfalfa Hay and Clover Hay When Fed Alone and in Combination with the Proteins of Corn ... 555–570
TURNER, WILLIAM A.; MEIGS, EDWARD B.; KANE, EDWARD A.; SHINN LEO A.; and HALE, WALTER S.: The Comparative Effectiveness, in the Dairy Ration, of Supplements of Phosphorus in the Form of Orthophosphoric Acid, Monosodium, Disodium, Trisodium Phosphates, and Bone Meal ... 619–630
TYSDAL, H. M.: Determination of Hardiness in Alfalfa Varieties by Their Enzymatic Responses ... 219–240

Ustilago spp. *See* Smut.

Virginia strains of codling moth, ability to enter sprayed and unsprayed apples, study. Walter S. Hough ... 533–553
Vitamin D, sources, effect on ash content of bones of chickens, experiments ... 997–1007
VORIS, LEROY, and BLACK, ALEX: A Statistical Study of the Relationships between the Constituents of Milk ... 1025–1032
WALDRON, L. R.: Increase of Kernel Weight in Common Wheat Due to Black-Point Disease ... 1017–1024
WALKER, J. C., and LARSON, R. H.: Soil Treatment in Relation to Clubroot of Cabbage ... 749–759
Walnut—
black, root infection by *Armillaria mellea*, cytological study ... 209–210, 211, 213–214
Persian, root infection by *Armillaria mellea*, cytological study ... 202–203, 204
WARNER, K. F.; ELLIS, N. R.; and HOWE, PAUL E: Cutting Yields of Hogs an Index of Fatness ... 241–255

Page

Wheat—
anatomy, developmental. M. A. McCall. 283–321
black chaff—
inheritance of reaction to, in spring-wheat crosses. H. K. Hayes, E. R. Ausemus, E. C. Stakman, and R. H. Bamberg ... 59–66
inheritance of reaction to, studies ... 37, 46–47, 54, 61, 63–64
breeding for resistance to loose smut, experiments ... 631–654
chemical composition, effect of leaf rust. 1058–1064
common, black-point disease, cause of increase of kernel weight. L. R. Waldron ... 1017–1024
crosses—
characters, independent inheritance, study ... 48–51, 54
coleoptile color, inheritance studies. 36, 48–49, 54
diseases of, inheritance of reaction to, studies ... 31–54, 59–66
resistance to loose smut, inheritance. D. C. Tingey and Bion Tolman ... 631–655
triangular, correlated inheritance of reaction to diseases and of certain botanical characters. Elmer R. Ausemus ... 31–57
embryo—
histology and morphology ... 286–306, 311–314
homologies, interpretation ... 306–311
hairy-neck character—
pollination experiments ... 614–615, 617
transposition from rye, irregularities in inheritance ... 603–617
homologies in. M. A. McCall ... 283–321
hybrids, stomatal behavior, relation to resistance and susceptibility to stem rust ... 31, 51–53, 54
inoculation with *Ustilago tritici*, experiments ... 633–637
kernel weight, increases due to black-point disease. L. R. Waldron ... 1017–1024
leaf rust—
(*Puccinia triticina*), effect on yield, physical characters, and composition of winter wheat. Ralph M. Caldwell, H. R. Kraybill, J. T. Sullivan, and Leroy E. Compton ... 1049–1071
inheritance of reaction to, in spring-wheat crosses. H. K. Hayes, E. R. Ausemus, E. C. Stakman, and R. H. Bamberg ... 59–66
Marquis, in irrigated plots receiving water at different times, border effect. D. W. Robertson and Dwight Koonce ... 157–166
morphological characters, inheritance studies ... 647–654
physical characters, effect of leaf rust ... 1056–1058
protein content, effect of leaf rust ... 1052–1053, 1059–1063, 1067–1069
resistance to loose smut—
biometrical studies ... 637–639
genetic studies ... 639–647
rye hybrids—
back-crossing with wheat, results ... 613–614
hairy neck in, effect on plant characters. 610–613
inheritance of hairy neck ... 608–610
smut infection, relation to seedling mortality ... 637–638
spring, crosses, reaction to stem rust, leaf rust, bunt, and black chaff, correlated inheritance. H. K. Hayes, E. R. Ausemus, E. C. Stakman, and R. H. Bamberg ... 59–66
starch content, effect of leaf rust ... 1064, 1066
stem rust—
inheritance of reaction to, in spring-wheat crosses. H. K. Hayes, E. R. Ausemus, E. C. Stakman, and R. H. Bamberg ... 59–66
inheritance of reaction to, study ... 31–34, 36–45, 53–54, 60, 61–62
relation of barberry to ... 953–968
sucrose content, effect of leaf rust ... 1064, 1065
varieties, infection caused by forms of *Puccinia graminis tritici* ... 960

Page

Wheat—Continued.
yellow berry, effect of leaf rust, study---- 1056–1057, 1069
yield from irrigated border rows, experiments---- 157–166
yields, effect of leaf rust---- 1051–1056
Wheats, winter, yields, physical characters, and composition, effect of leaf rust (*Puccinia triticina*) on. Ralph M. Caldwell, H. R. Kraybill, J. T. Sullivan, and Leroy E. Compton---- 1049–1071
WHITE, RICHARD P., and MCCULLOUGH, LUCIA: A Bacterial Disease of *Hedera helix*---- 807–815
Wilt, bacterial, resistance of alfalfa to, tests. Fred Reuel Jones---- 1085–1098
Wound-periderm formation, gladiolus, effect on infection by *Penicillium gladioli*---- 277–280
WRIGHT, R. C., and LAURITZEN, J. I.: Factors Affecting *Gladiolus* in Storage---- 265–282

Zea mays×*Euchlaena perennis* hybrids, chromosomes. A. E. Longley---- 789–806
Zenillia libatrix Panzer, a tachinid parasite of the gypsy moth and the brown-tail moth. Philip B. Dowden---- 97–114